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*Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.*

*Therefore, this*

United States Patent

*Grants to the person or persons having title to this patent the right to exclude others from making, using or selling the invention throughout the United States of America for the term of seventeen years from the date of this patent, subject to the payment of maintenance fees as provided by law.*

Acting Commissioner of Patents and Trademarks

*Melvin Gary*  
Attest

# United States Patent [19]

Yock et al.

[11] Patent Number: 4,887,606

[45] Date of Patent: Dec. 19, 1989

## [54] APPARATUS FOR USE IN CANNULATION OF BLOOD VESSELS

[76] Inventors: Paul G. Yock, 25 Cerritos Ave., San Francisco, Calif. 94127; Alan R. Selfridge, 2592 Middlefield Rd., Palo Alto, Calif. 94301

[21] Appl. No.: 296,272

[22] Filed: Jan. 11, 1989

### Related U.S. Application Data

[63] Continuation of Ser. No. 908,556, Sep. 18, 1986, abandoned.

[51] Int. Cl.<sup>4</sup> ..... A61B 8/12

[52] U.S. Cl. ..... 128/662.05; 128/662.06

[58] Field of Search ..... 128/662.05, 662.06

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Primary Examiner—Francis Jaworski  
Attorney, Agent, or Firm—Flehr, Hohbach, Test,  
Albritton & Herbert

[57]

### ABSTRACT

Apparatus for use in cannulation of blood vessels includes a hollow needle having a sharpened end for penetrating tissue, a trocar including a transducer mounted on one end for positioning within the hollow needle for transmitting and receiving ultrasonic waves through the sharpened end of the needle. The trocar further includes a support rod for the transducer and ultrasound damping material attaching the transducer to the support rod. Electrical conductors are provided through the support rod or on the surface of the support rod in contact with electrodes on the front and back surfaces of the transducer for transmitting electrical signals to and from the transducer. A syringe portion is detachably attached from the needle for receiving the back flow of blood when the needle is inserted into a blood vessel.

6 Claims, 2 Drawing Sheets

